

	Facility: Emerald			Parts:	
Date	Service Event/Repair Performed	Run Hours	Performed By	Parts Used	Reason for Service
Mon 6/26/17	Replaced 1 Head Bolt on cylinder #				Broken Bolt
Mon 6/26/17	Replace Nox sensor on engine				Failed Sensor
Mon 7/10/17	Oil Change, Valve adjustment, Cleaned S.P., Air Filter				Scheduled Maintenance
Thu 7/13/17	Replaced ECON-4				Original ECON-4 had burnt terminals (suspecting water leaking into control panel)
Fri 7/14/17	Replaced Bio-gas blower @ genset			10 HP backup (Haviland)	Original gas blower bad
Mon 7/24/17	Replaced engine gas blower drive with upgraded Powerflex 525 to match new 10HP blower			powerflex 525	Water inside drive cabinet shorted out drive.
Thu 7/27/17	Econ-4 Module, just replaced on 7/13/17, failed preventing engine from starting. Replaced with new module and turning in previous one for possible warranty repair				Module failed to output signal to throttle.
Mon 7/31/17	Replaced ECON-4 (previously replaced 7/27. *See 7/27/17 entry) , Woodward Proact 75 Actuator			ECON-4 Model # RS232. Woodward Proact 75 Actuator Part No. 8405-050.	Experienced same issues as 07/21/17 entry. Was determined that ECON-4 failure was linked to faulty actuator.
Wed 8/9/17	Engine stopped due to fuses leading to radiator fans blown (possibly due to flare blower failing violently???) , led to high intake temperatures causing shutdown. Engine failed to restart after repair. Discovered solenoid gas valve no shutting or not fully shutting causing engine gas flooding. Had to disable blower and shut manual gas valve to restart.				Failed power to radiator fans
Tue 8/29/17	Shut engine down to replace contactor to cooling fan #2. Upon restart determined that condensate trap sump pump was not operating and needs replaced.				
Tue 9/12/17	Upgraded engine exhaust fan system to handle 30 amps to eliminate underdesigned system as a potential cause of supply fuses blowing. If fuses still blow, then next course of action is to hot megger exhaust fan #2. Fan meggers satisfactorily when not running.				
Tue 9/12/17	Inspected engine exhaust heat exchanger. There are several leaks at the tube sheet on the inlet/outlet side. Recommend replacing.				
Tue 9/12/17	Inspected engine gas solenoid valve. Downstream valve is pinned open due to solenoid not opening; upstream valve now leaks by forcing operator to shut manual valve to start engine due to continuous flooding. Ordering new valve.				
Tue 11/14/17	Oil Change, Cleaned and inspected spark plugs @ 30475 RH			75 gal oil & Filters (3)	Scheduled Maintenance
Wed 11/22/17	Replaced 1 broken head bolt on same cylinder as 6/26/17. had to remove head to access broken bolt. Should have replaced all bolts during job but did not consider it until too late. Will replace all bolts with any future failure.				Broken Bolt
Wed 11/22/17	Replaced oil line that feeds auxiliary external water pump. Line failed				Oil line failed at connection
Wed 11/22/17	Econ-4 module failed again. This is a repeat failure that seems to happen following shutdowns. I suspect the throttle is sticking shut causing too much current draw from module, burning it out. Only a theory however. Corrective action is to cycle throttle with external voltage (wires unhooked) prior to future startups. Also priding a new upgraded 'smarter' throttle as recommended by Martin Engineering.				Failed Econ 4 module.
Thu 11/30/17	Cleaned and regapped spark plug on cyl #7. - Ropke				Engine went down due to cold cyl temp - Ropke
Sun 12/3/17	Installed new spark plugs on cyl 2 & 7 - Ropke			2 - Denso Gi3-5 / 6117	Engine went down due to cold cyl temps - Ropke
Tue 12/5/17	Replaced thermocoupler on cyl 7 - Ropke			1 Thermocoupler	Engine went down due to cold cyl temp - Ropke
Tue 3/13/18	Replaced battery closest to generator.				crack battery
Fri 4/13/18	Replaced battery charger				Failed charger most likely due to water intrusion
Fri 4/13/18	Performed oil and filter change.				Scheduled Maintenance
Fri 4/13/18	Cleaned out water chiller and knockout drain lines. Removed all media from knockout and cleaned.				Possible clogging of gas flow. Drain kept dogging with effluent.
Thu 4/26/18	Replaced Head,piston, liner, and connecting rod on cylinder #13				Chipped valve. Indications were high temp on #13 with a quick 100 Degree rise, adjacent cylinder temperatures rose by 20 degrees. Nox also increased at least 4 times normal value. Engine shut down on cylinder temperature. Metallic noise issued from turbo area on troubleshooting restart. Noise went away. Compression check on cylinders were as follows: 1-170, 2-171, 3-182, 4-172, 5-175, 6-180, 7-182, 8-185, 9-159, 10-173, 11-174, 12-171, 13-0, 14-172, 15-165, 16-176
Thu 4/26/18	Replaced engine air filters.				Routine Maintenance
Thu 4/26/18	Replaced o-rings on left side (as looking at it) oil cooler piping				Leaking joint on oil cooler side
Thu 4/26/18	Replaced gaskets on water elbow from head on cylinder #1				Leaking water connection while operating
Wed 5/2/18	Replaced turbo on right side				Previous chipped valve pushed out fixed blades on exhaust inlet side restricting flow
Thu 5/31/18	Changed oil/filter/gas filter/air filter/valve adjustment on engine				Routine Maintenance
Tue 7/10/18	Capped broken future gas line that used to come out of the ground. For future reference. The cap is 18" from the exhaust fan end of the generator skid, about half way inbetween the door and the opposite corner of skid.				Future line sticking out of ground broke off
Tue 7/17/18	Changed oil and filters on engine. Makeup volume was app. 28 gallons.				Routine Maintenance
Tue 7/17/18	Performed camera inspection of underground piping. There is at least one low spot app 40' from digester that is completely full of water when gas isn't flowing. Engine will run at full loading today. I believe it is due to a dry season introducing less water leakage through a probably pipe crack. For the past month, engine loading has been limited to around 500kw, with anything above that causing prerog gas pressure to swing app 20", ultimately causing a shutdown on MAP control failure.				Engine not fully loaded. Still investigating. Probably need to replace underground piping.
Wed 8/15/18	Replaced head gasket on cylinder 16.				Leaking head gasket.
Fri 8/31/18	Changed oil and filters on engine. Makeup volume was app. gallons.				Routine Maintenance
Wed 9/26/18	Generator output breaker failed. Sent out for repair, however replaced with a retrofitted breaker direct from ABB. Caused an 8 day downtime.				Failed breaker power supply. Charging springs would not latch or stay latched even manually.
Mon 10/22/18	Changed oil/filter/gas filter/air filter/valve adjustment on engine. Spark plugs changed approx 2 weeks ago when started having trouble with cold cylinders. Changed crankcase filter. Makeup volume not determined due to problems with excessive makeup during last oil change cycle. Believed to be due to dogged crankcase filter causing excessive pressure in crankcase, resulting in adequate pressure in makeup valve to push float down. (Just Brian's Theory).				Routine Maintenance
Sat 12/22/18	Oil Change and filters on CHP		JCR		Routine Maintenance
Sun 12/23/18	Cyl #85 replacement and turbo (RH), tuning		Martin Energy Group		Dropped valve on Cyl #85
Fri 1/25/19	Cyl #15 Replacement - Head and turbo LH, tuning (Online 1/27)		Martin Energy Group	Head, gasket kit, turbo	Cyl #15 cold temp shut down. Performed compression and basic scope. Called Martin to perform. They arrived the evening 1/25, departed 1/26. JCR performed Turbo install 1/27
Tue 2/19/19	Changed oil & filter/air filter.		JCR		Routine Maintenance
Tue 2/19/19	Replaced right side starter		JCR		not working
Tue 3/5/19	Extracted broken cylinder head bolt/stud		JCR/Martin Energy Group		Head bolt/stud failed on 3/3. Martin recommended that we replace just stud. Once replaced it was determined that the head gasket had also failed.
Wed 3/6/19	Replaced cylinder head gasket on cyl. #10		Martin Energy Group		
Fri 4/5/19	Oil Change and filters on CHP		JCR	filter, oil air	Scheduled Maintenance
Thu 4/18/19	Replaced cyl. #2 head gasket		JCR	head gasket kit	original gasket failed. Broken head bolt.
Tue 5/21/19	Oil Change, Valve adjustment, Cleaned S.P., Air Filter				Scheduled Maintenance
7/24/19	Weld 2 2"npt ports 3" above muffler on stack at 90 degrees. G44		JCR	2 - 2" black iron nipples, 2 - 2" black iron plugs, s.s. welding rod	Requested for emissions testing
08.14.19	engine clean up, filter, wire check, plug check		FRO	n/a	chp was scheduled for predictive maint,
Tue 8/20/19	Replaced oil cooler		JCR	martin supplied part	oil leaking into coolant plumbing

[illegible]